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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,901	04/21/2005	Henk Ouwerkerk	B-5550PCT 622237-5	8585

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EXAMINER	
KIM, TAE JUN	

ART UNIT	PAPER NUMBER
3746	

MAIL DATE	DELIVERY MODE
03/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/510,901	OUWERKERK, HENK	
	Examiner	Art Unit	
	Ted Kim	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5 and 7-15* is/are pending in the application.

4a) Of the above claim(s) *7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5 and 8-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 February 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. The restriction requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-6, 8-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 1, last two lines, "one or more of said steam turbines" lacks proper antecedent basis.
- Claim 6, "the steam turbines" lacks proper antecedent basis.
- Claim 11 "one or more of said steam" lacks proper antecedent basis.
- Claim 12 "one or more of said gas" lacks proper antecedent basis
- Claim 13 "one or more of said gas" lacks proper antecedent basis.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 5, 8-13, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frutschi (6,223,**523**) in view of either the common knowledge in the art or Lardi et al (3,948,054) and further in view of either Frutschi (5,758,**485**) or Frutschi (5,884,**470**). Frutschi '**523** teaches a steam and gas turbine installation comprising a gas turbine unit (1, 3, 5) and a steam turbine unit (16, 17), in which the gas turbine unit is built up in part of at least: a first gas compressor 1 mounted on a compressor steam turbine shaft (47), a combustion chamber (2) and a gas turbine (3) mounted on a gas turbine shaft (47); and in which steam turbine unit (16, 17) is built up in part of: a closed steam line (34, 20, 21, 32 …), at least comprising: a pump (25 or 29a), a steam generator (15), which is in heat-exchanging contact with combustion gases (11) from the gas turbine (3) during operation, at least one steam turbine (16, 17) mounted on the compressor steam turbine shaft (47), as well as a condenser (22), and in which the at least one steam turbine drives the first gas compressor of the gas turbine unit during operation; characterized in that one or more of the at least one said steam turbine and the gas compressor are mounted on the same shaft (47). Frutschi does not teach the one or more of said steam turbines is an impulse steam turbine. However, as well known in the art, including in thermodynamics textbooks, using impulse steam turbines is entirely conventional in the art, as there are only two choices, impulse steam blades or reaction steam blades.

The following information is freely available on steam turbines from http://www.roymech.co.uk/Related/Thermos/Thermos_Steam_Turbine.html

Introduction

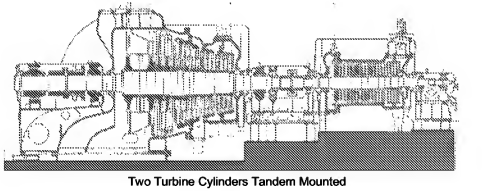
A steam turbine is a mechanical device that converts thermal energy in pressturised steam into useful mechanical work. The original steam engine which largely powered the industrial revolution in the UK was based on reciprocating pistons. This has now been almost totally replaced by the steam turbine because the steam turbine has a higher thermodynamic efficiency and a lower power-to-weight ratio and the steam turbine is ideal for the very large power configurations used in power stations. The steam turbine derives much of its better thermodynamic efficiency because of the use of multiple stages in the expansion of the steam. This results in a closer approach to the ideal reversible process.

Steam turbines are made in a variety of sizes ranging from small 0.75 kW units used as mechanical drives for pumps, compressors and other shaft driven equipment, to 1,500,000kW turbines used to generate electricity. Steam turbines are widely used for marine applications for vessel propulsion systems. In recent times gas turbines , as developed for aerospace applications, are being used more and more in the field of power generation once dominated by steam turbines.

Steam Turbine Principle

The steam energy is converted mechanical work by expansion through the turbine. The expansion takes place through a series of fixed blades (nozzles) and moving blades each row of fixed blades and moving blades is called a stage. The moving blades rotate on the central turbine rotor and the fixed blades are concentrically arranged within the circular turbine casing which is substantially designed to withstand the steam pressure.

On large output turbines the duty too large for one turbine and a number of turbine casing/rotor units are combined to achieve the duty. These are generally arranged on a common centre line (tandem mounted) but parallel systems can be used called cross compound systems.

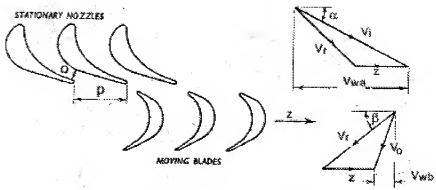


Two Turbine Cylinders Tandem Mounted

There are two principles used for design of turbine blades the impulse blading and the reaction blading.

Impulse Blading

The impulse blading principle is that the steam is directed at the blades and the impact of the steam on the blades drives them round. The day to day examples of this principle is pelton wheel. In this type of turbine the whole of the stage pressure drop takes place in the fixed blade (nozzle) and the steam jet acts on the moving blade by impinging on the blades.



Velocity diagram impulse turbine stage

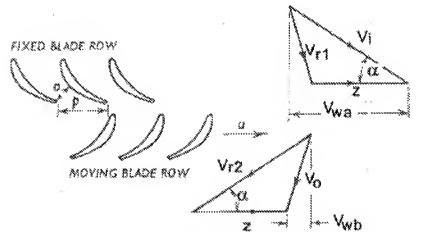
z represents the blade speed , V_r represents the relative velocity, V_{wa} & V_{wb}- represents the tangential component of the absolute steam in and steam out velocities

The power developed per stage = Tangential force on blade x blade speed.

Power /stage= (V_{wa} - V_{wb}).z/1000 kW per kg/s of steam

Reaction Blading

The reaction blading principle depends on the blade diverting the steam flow and gaining kinetic energy by the reaction. The Catherine wheel (firework) is an example of this principle. For this turbine principle the steam pressure drop is divide between the fixed and moving blades.



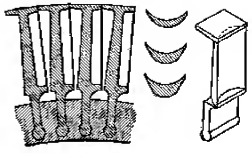
Velocity diagram reaction turbine stage

z represents the blade speed , V_r represents the relative velocity, V_{wa} & V_{wb}- represents the tangential component of the absolute steam in and steam out velocities

The power developed per stage = Tangential force on blade x blade speed.

Power /stage= (V_{wa} - V_{wb}).z/1000 kW per kg/s of steam

The blade speed z is limited by the mechanical design and material constraints of the blades.



Lardi et al teach the hp steam turbine 24 has impulse blading (col. 6, lines 3+). It would have been obvious to one of ordinary skill in the art to employ the impulse turbine for one of the steam turbines, as there are only two classes of steam turbine blading commonly available and/or as the conventional practice in the art. Frutschi **'523** does not illustrate the compressor 1 with intercooler 36 is two different compressors but illustrate them as a single compressor. However, Frutschi **'523** further teach that the compressor 1 can be at least one compressor, and therefore two compressors that are intercooled and connected in series (see col. 8, lines 1+). In previous work, Frutschi **'485** teaches that it is old and well known in the art to employ a further compressor 1 with a compressor 2 and intervening intercooler 9 where the first compressor and further compressor are connected in series and driven by the same shaft via turbine 4. Similarly, Frutschi **'470** teaches it is old and well known in the art that the compressor 1 can be at two compressors where there is a first compressor 1b, and a further compressor 1a which are intercooled via intercooler 37 and connected in series. These compressors 1a, 1b are clearly driven by the same shaft 53 (see col. 3, lines 1+). The use of multiple compressors with the intercooling would allow more optimum matching of the pressures

with the intercooled gas and/or greater efficiency. Alternately, it is an equivalent configuration for the compressor stages with intercooling used in the art. It would have been obvious to one of ordinary skill in the art to employ multiple compressor stages with the intercooler rather than a single compressor, as taught by either Frutschi **'470** or **'485**, to allow for greater efficiency and/or optimization and/or an equivalent configuration used in the art and consistent with the teachings of Frutschi **'523**. In combination, the steam turbine drives at least one further gas compressor, which is connected in series with the first gas compressor via an intercooler 36; characterized in that at least one further steam turbine (17) is connected in series with the steam; characterized in that the gas compressors and the steam turbines are mounted on the same shaft 47; characterized in that the water flowing through the steam line (39) is in heat-exchanging contact during operation with the air 37 flowing through the intercooler; characterized in that said heat-exchanging contact takes place according to the counterflow principle, as illustrated in any of the Frutschi patents. The uniflow/coflow principle in intercoolers is also notoriously old and well known in the art; making one or more of said steam turbines a radial steam turbine and one or more of said gas compressors is a centrifugal gas compressor or an axial gas compressor are also notoriously old and well known in the art. It would have been obvious to employ uniflow/coflow principle in intercoolers or a radial steam turbine or a centrifugal or axial compressor, as features which are conventionally employed in the art.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over any of the above prior art in view of Mastronarde (6,055,803). The prior art teach various aspects of the prior art but do not teach the steam generator is a once-through residual heat boiler. Mastronarde teaches it is old and well known in the art to make the heat recovery steam generator in the exhaust stream of a gas turbine engine a once through residual heat boiler (col. 2, lines 32+) allows for rapid startup and reduces thermal stress limitations. It would have been obvious to one of ordinary skill in the art to make the heat recovery steam generator in the exhaust stream of a gas turbine engine a once through residual heat boiler, as taught by Mastronarde, in order to allow rapid startup and reduce thermal stress limitations.

Response to Arguments

7. Applicant's arguments filed 02/11/2008 amend around the Horner combination. Applicant's arguments concerning Frutschi and Rice are noted, however it is noted that the additional disclosure of Frutschi '523 teach that the compressor 1 can be at least one compressor, i.e. two compressors (col. 8, lines 1+). Hence, the modification to Frutschi '523 via Rice would not necessarily entail separate shafts. However, to address applicant's concerns on this, Frutschi '485 or Frutschi '470 teaches the compressors with intercooler are on the same shaft and are an equivalent configuration.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer, can be reached at 571-272-7118. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm

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